

Chapter 1

Perceptron

In order to simplify the Neural Networks' introduction, we are going to describe first what Perceptron is.

The perceptron algorithm for halfspaces.¹

First, basic definitions:

The class of affine function L_d is the defined as follows:

$$L_d = \{h_{w,d} : w \in \mathbb{R}^d, b \in \mathbb{R}\}$$

Based on a target function and training examples fixed from a specific decision problem.

We define a simple learning model as a : Let define the input space as $\mathcal{X} = \mathbb{R}^d$ where $d \in \mathbb{N} - \{0\}$ and \mathcal{X} the d -dimensional Euclidian space.

The output space is defining as $\mathcal{Y} = +1, -1$.

We specify the hypothesis set $\mathcal{H} = \{h(\mathbf{x}) = \text{sign}(w^T \mathbf{x} + b) \text{ where } w, \mathbf{x} \in \mathcal{X} \text{ and } b \in \mathbb{R}.$

The weight vector is w and \mathbf{x} are the elements from the training set.

The model of \mathcal{H} is called the *perceptron*.

And a simple example

¹A half-space is either of the two parts into which a hyperplane divides a affine space.

Chapter 2

Multilayer perceptron

Multilayer perceptron is the result of compose multiple simple perceptron.

TODO GIVE A EXAMPLE OF MULTILAYER PERCEPTRON.

The MLP is often called a hard threshold neural network because the transformation function is a hard threshold at zero, and they where traditionally the tanh,

MLP is a type of neural network, based on the construction it has not recursion, otherwise we usually talk about RNN Recurrent Neural Networks.